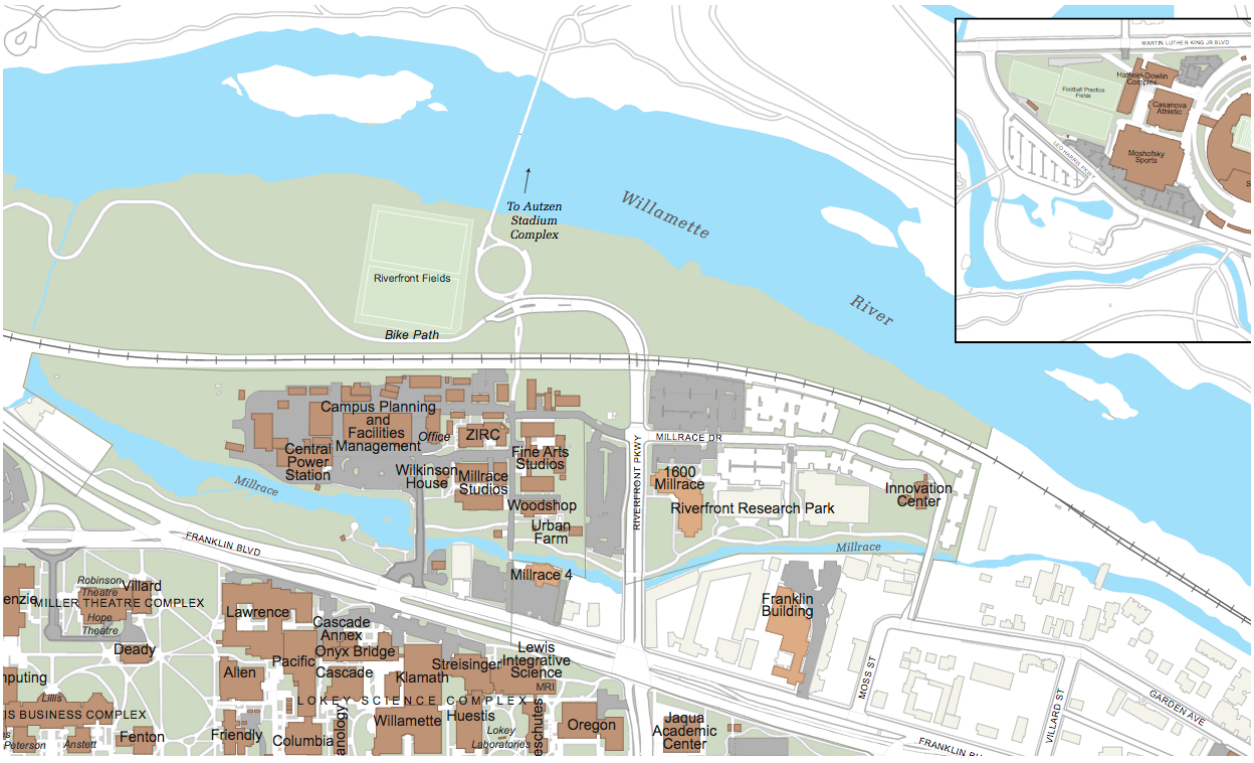
Oregon Abroad

Interdisciplinary Projects on the Eugene Millrace and Willamette River

Eugene's Willamette River and the power canal or "millrace" built by early settlers in the 1850s are complex but integral physical, natural, and historical features that have shaped the city's dynamic past and continue to affect its present and future. In the fifth century BCE the Greek philosopher Heraclitus famously observed that one "cannot step into the same river twice." What did he mean? Heraclitus clarified that both rivers and people constantly change. What about the Willamette and its millrace? What are they—places, structures, processes, habitats, ecological systems, ideas—all of these at once? In conjunction with our ENVS 375 seminar, we will study the river and millrace collectively and individually through projects that students will define in consultation with the instructors and each other. Taking advantage of our diverse interests, training, and experience, together we can explore and assess the current state of Eugene's river and millrace, examine how the millrace and river got this way, diagnose problems or challenges associated with them, and perhaps reimagine their restoration, preservation, or improvement.



Below are some questions and ideas to consider, some of which might form the basis for your individual projects

Terrestrial and Aquatic Systems

- How would you characterize the flow in the millrace? Rapid or stagnant? What properties of the channel reflect this flow regime? By contrast, how would you

characterize the flow of the main channel of the Willamette River by the Autzen footbridge?

- Aquatic invertebrates likely reflect the differences in flow between the river and the millrace. Explore the differences in invertebrates. How might differences invertebrates matter to different development stages of fish? Some invertebrates are also markers for pollution, are any of these present?
- The Willamette River experiences large variations in flow each year due to seasonal rainfall, how might the flow in the millrace vary before and after management?
- How "dynamic" (prone to erosion, migration, or avulsion) do you suspect the millrace would have been relative to the mainstem of the Willamette River before and after settlement?
- Different environments favor different organisms. What birds and animals are favored by the river, and which ones are favored by the slower moving water of the millrace? How much overlap is there?
- How do aquatic biota co-evolve with rivers? In other words, how does the flow and evolution of river channels affect proximal organisms? And vice versa. Is it more or less likely that biota affect the behavior of the millrace when compared to the mainstem Willamette River?
- Is the millrace polluted? This is a key question that the future of the Millrace may rest on. The perception is that because it is smelly, it is polluted. However, stagnant water is smelly due to gasses produced during anaerobic decay and it is not necessarily polluted. We have the ability to measure for the following pollutants: nitrates, iron, copper, chlorine, dissolved oxygen, and fecal coliform bacteria. The millrace could be compared with the river.
- Describe the bed of the Willamette River and the bed of the millrace? What might be responsible for these differences? How might these differences reflect AND affect land use and human activities along the river and in the catchment upstream?
- How does the presence and connectivity of secondary channels like the millrace affect flooding and hazard potential along the Willamette River?
- How has the UO-Eugene reach of the Willamette River changed in the last 150 years? Why? How do these changes influence the potential for restoration, development, etc?
- How might climate change over the next 50-100 years affect the flow regime of the Willamette River and secondary channels like the millrace? How might the management (or lack thereof) reflect these predictions?
- What would this area have been like 50, 100, 150 and 500 years ago in terms of hydrology and channel properties?
- What would this area have been like 50, 100, 150 and 500 years ago in terms of plants and animals? How could the millrace be described in terms of succession?
- The millrace was originally constructed in 1851 by Hillyard Shaw, who ingeniously connected two existing "sloughs" or secondary river channels to create a power canal for industrial purposes. What is commonly meant by the term, "slough," and is the millrace currently acting as one?

To address these and other questions, students will learn and use some of the following: mapping & historical analysis of photos and reports; hydrology/geomorphology, flood frequency analysis; water quality analyses (two kinds: aquatic inverts and chemistry); field survey techniques

Human Systems

- What is a millrace—and what is the Eugene Millrace—and how might it be understood differently or variably, among people and groups and over time? Is it a physical, manmade structure, a natural feature? Is it economic infrastructure, a recreational facility, an aesthetic object or feature, an urban amenity or urban blight?
- The millrace and river have undergone substantial natural and human transformation over the past century and a half. How should we describe such change—have the river and millrace declined or been degraded? How do we define landscape or environmental degradation—according to what criteria?
- What is the value of millrace—economically, ecologically, socially, civically, culturally, historically, aesthetically?
- Should it be an object of historical preservation? of restoration?
- How does Eugene compare to other western American or U.S. cities and their relationships with their industrial, riparian landscapes? Are there models to be embraced or avoided?
- What is the likelihood of restoration of the Eugene millrace? How would its "restoration" be defined or conceived, and what form might it take? Why do it? What would/might the millrace's restoration look like? Or, to what former state would/should the millrace be restored? Why not just erase it and recreate the landscape as it was, say, circa 1850?
- What are the politics and finances of millrace restoration? What might it cost, and where might the money come from? Assess the possibilities and implications of private and public funding. Who is likely to benefit? Would there be losers as well as winners in any restoration project?
- Water has an aesthetic value. If you are artistically inclined, you could illustrate scenes along the river and millrace in your chosen medium as your project. In addition to the illustrations, a short written commentary on each illustration will be required.

To address these and other questions, students will learn and use some of the following: archival research and analysis of historical documents, maps, and images; social, political, and economic analysis of public records, including planning and zoning documents; oral history and interviewing; historical interpretation—assessing historical texts in context; historical writing.

Guideline for Projects

Students should select research projects that make best use of their training, expertise, and interests (though we hope that all of these will advance during the class, and we are happy to help students acquire new disciplinary tools). Individual project may be related but shouldn't overlap excessively or duplicate each other. A range of term projects will allow us to study the

millrace and river broadly, and through students' final presentations permit us to learn from each other and expand our collective knowledge.

You should plan on spending 5-10 hours per week on your project. It is best to plan your time so that you consistently work on it every week, which will allow your project to develop in an organic way. Don't short change yourself. It is very obvious to us when projects are done at the last minute, as they are incomplete, less interesting, and poorly constructed.

In the first week of the term each of you will meet with us on Friday April 7th in Heustis 111. Come prepared with a topic area from the above list, or one you have invented that is pertinent to understanding the natural or cultural history of the Millrace/River. We will help you to circumscribe a project that is doable in nine weeks. We expect that all students will turn in a written document, but the form that it takes will depend on discipline and the nature of the project.

For example,

- if you choose to do watercolor paintings of the millrace/river, you might submit 10 paintings and a commentary on how and why these works express or cultivate understanding of the millrace.
- if you choose to do a project that involves measurement and analysis, then we'd like you to write up a formal report in the form of a scientific paper. This should be no longer than 15 pages, including graphs, figures, tables and references. Detailed guidance on what we are looking for will be on CANVAS.
- if you chose to undertake historical or social scientific analysis, we would expect you to conduct research in primary sources and ultimately write an analytical or interpretive paper of approximately 15-20 pages, with appropriate notes and bibliography.
- If you chose some other artistic, creative work—say, a series of poems—you would expect you to submit a significant portfolio of works and a commentary that explains the work, its form, its motivation, and how it interprets the millrace/river.